

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference UPN-4426	FOR FURTHER ACTION <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. PCT/US05/00793	International filing date (<i>day/month/year</i>) 11 January 2005 (11.01.2005)	(Earliest) Priority Date (<i>day/month/year</i>) 12 January 2004 (12.01.2004)
Applicant THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (See Box No. III)

4. With regard to the **title**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

Please See Continuation Sheet

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. _____

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☒ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/00793

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12N 5/02; A01N 63/00

US CL : 435/375, 377; 424/93.7

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/375, 377; 424/93.7

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,467,808 (BRIGHTON et al) 28 August 1984 (28.08.1984), see entire document	1-25
X	US 2003/0211084 A1 (BRIGHTON et al) 13 November 2003 (13.11.2003) see entire document.	1-23
A	WANG W. et al Up-regulation of Chondrocyte Matrix Genes and Products by Electric Fields. Clinical Orthopaedics and Related research. October 2004, No.427S, pages S163-S173. see entire document.	1-25
A	BRIGHTON C.T. et al. Signal Transduction in Electrically Stimulated Bone Cells. The Journal of Bone and Joint Surgery Am. October 2001, Vol.83-A, No.10, pages 1514-1523. see entire document.	1-25
X	ZHUANG H. et al. Electrical Stimulation Induces the Level of TGF- β 1 mRNA in Osteoblastic Cells by mechanism involving Calcium/Calmodulin Pathway. Biochemical and Biophysical Research Communications, 1997, Vol.237, pages 225-229. see entire document.	1-6 and 16-21



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

21 July 2005 (21.07.2005)

Date of mailing of the international search report

19 AUG 2005

Name and mailing address of the ISA/US

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	PIEKOWSKI D. et al, Low-power electromagnetic stimulation of osteotomized rabbit fibulae. The Journal of Bone and Joint Surgery, April 1994, Vol.76-A, NO.4, pages 489-501. see entire document.	1-25

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/00793

Continuation of Item 4 of the first sheet:

Examiner: Title exceeds the required length

New title:

Up-regulation of bone morphogenetic protein (BMP) gene expression in bone cells by electromagnetic signals

Continuation of B. FIELDS SEARCHED Item 3:

Databases: medline, caplus, scisearch embase, uspat, pgpub, derwent, jpo, epo.

Search terms: bone morphogenetic protein, BMP, TGF, electric, electromagnetic stimulaiton, bone, osteoblast, gene expression , fracture, osteoporosis.